The Scarborough System.

MasterType's™ Figures+Formulas™

By Lizzy Corp. The "computing encyclopedia" of weights and measures. Converts, calculates and quizzes. Entertaining and educational for kids. A reference and working tool for adults as well.

For ages 8 to adult

MasterType's™ Figures + Formulas™

CREATED BY LIZZY CORP.

Published by Scarborough Systems, Inc.
25 North Broadway, Tarrytown
New York, 10591 U.S.A.

Copyright © 1984 by
Scarborough Systems, Inc.
Trademark 1984 by
Scarborough Systems, Inc.
All rights reserved.

This manual and the software described in it are copyrighted. All rights are reserved. This document and the software described in it may not, in whole or in part, be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine readable form without prior written consent from Scarborough Systems, Inc.

ISBN: 0-916377-30-4 (Commodore 64)
0-916377-31-8 (Apple)

Copyright © 1984 Scarborough Systems, Inc.
Printed in U.S.A.

Contents

Introduction 5

Getting Started 7

The Main Menu 8
Pick a Category or Quiz 9
Pick a Pair of Units 10
There's "More . . . " 10
Entering Numbers 11
Oops! Wrong Column! 12
Rules To Remember 12
What Are Your "Options"? 12

Categories 15

Area 16
Dry Volume 17
Length 18
Liquid Volume 19
Money 20
Number Systems 21
Recipes 24
Temperature 24
Time 25
Time in Cities 25
Weight 26
Weight on Planets 27
Quiz—Flash Cards 28
Quiz—Measure Match 30

Introduction

Welcome to *Figures and Formulas*. *Figures and Formulas* turns your computer into a calculator that the whole family can use. With *Figures and Formulas* you can figure out operations such as $2 \times 7 - (167 \times 4)$ quickly and easily and even perform sophisticated calculations in any base from 2 to 16.

But *Figures and Formulas* is not only a calculator, it's a converter, too. It lets you convert from one unit of measure to another within any given category. Although the program can be used alone, you'll find it just as instructive and fun using it with your friends. For example, with *Figures and Formulas* you can learn:

How many gills are in a hogshead.

How many Superdomes would fit inside Rhode Island.

How much flour you'll need for Aunt Ida's chocolate cake recipe that serves 6 people when you're planning to have 28 chocolate lovers at Cousin Seymour's birthday party.

How much you would weigh on the moon.

How many minutes your 83-year-old grandmother has lived.

Figures and Formulas will also handle more serious tasks. Because it can quickly calculate foreign currency conversions given the current exchange rates, *Figures and Formulas* will help you to plan a budget for your vacation overseas and compute your foreign travel expenses for your business and personal records. It can also help you to know exactly how much paint you'll need to cover the exterior of your house.

And this is just the beginning.

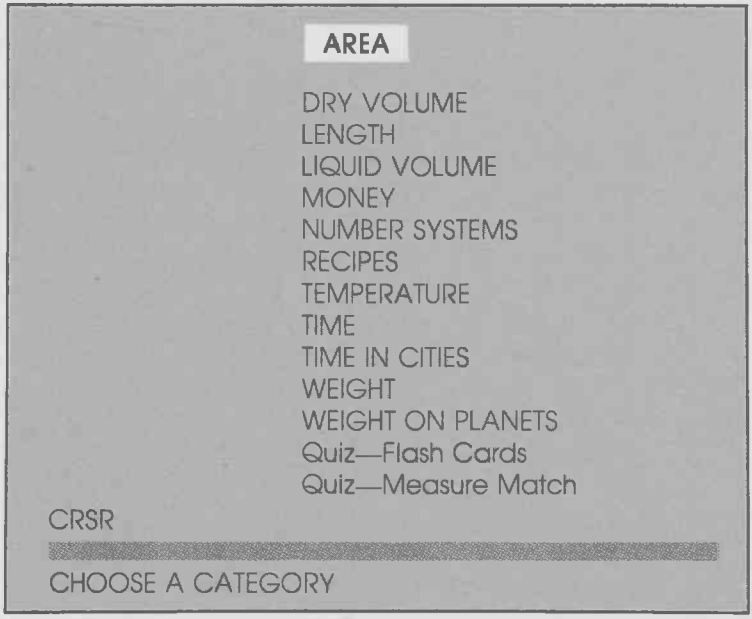
Figures and Formulas was designed to encourage people of all ages to explore some of the fascinating properties and relationships of numbers—without having to face a cluttered or confusing screen or an unfamiliar system of notation. *Figures and Formulas* includes a wide variety of standard and nonstandard categories of equivalents and demonstrates in a fun, easy way that more than one method can be used to measure the same thing.

Getting Started

The Main Menu

Enclosed in your *Figures and Formulas* package is a machine-specific guide. It shows you which keys you'll use to operate *Figures and Formulas* and tells you how to load the program. Take a moment now to read it.

After you have loaded your program, the following screen will appear:



This is your main menu. Listed in alphabetical order are the major categories of the program. Each of these categories has subcategories of its own (except RECIPES and TEMPERATURE). Most of these categories are divided into non-metric and metric units, which are arranged in lesser-to-greater order so that you can know immediately by looking at the menu the relationships between the units.

BECAUSE ALL THE ANSWERS IN **MEASURE MATCH** ARE "RIGHT," YOU'LL LEARN EQUIVALENTS TWICE AS FAST!

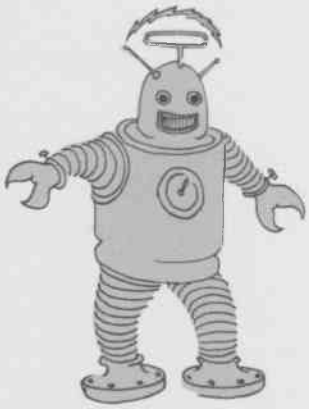
Also included are two quiz sections: FLASH CARDS and MEASURE MATCH.

FLASH CARDS challenges and sharpens your mathematical skills. It asks you to solve addition, subtraction, multiplication, and division problems using Roman numerals and numbers from base 2 to 16.

MEASURE MATCH tests your sense of relationships (between units, not people!). After you select two units to convert, MEASURE MATCH offers you multiple-choice questions. Although there is only one "right" answer, there really is no "wrong" answer, either. How can that be? Because each of the choices you're given is also a correct answer, but for units other than the ones you picked. This way you can learn equivalents twice as fast!

Pick a Category or Quiz

TO PICK A CATEGORY OR UNIT, JUST MOVE THE CURSOR TO YOUR CHOICE AND PRESS **RETURN.**



The main menu offers you a choice of twelve categories and two quizzes. It's very easy to make a selection. Just press the correct key to move the cursor to your choice (see your machine-specific guide), then press RETURN. That's all you have to do!

Pick a Pair of Units

Once you've picked a category, you'll need to pick a pair of units. This is just as easy to do as choosing a category because you simply press the same keys.

First you'll be asked to

CHOOSE ONE

unit. Just press the correct key until the cursor covers your choice, then press **RETURN**.

Next you'll be asked to

CHOOSE ANOTHER

unit. Again, press the key until the cursor covers your choice, then press **RETURN**.

If at any time you wish to go back to your main menu— or any previous screen, for that matter—use the **ESCAPE** key (see your machine-specific guide).

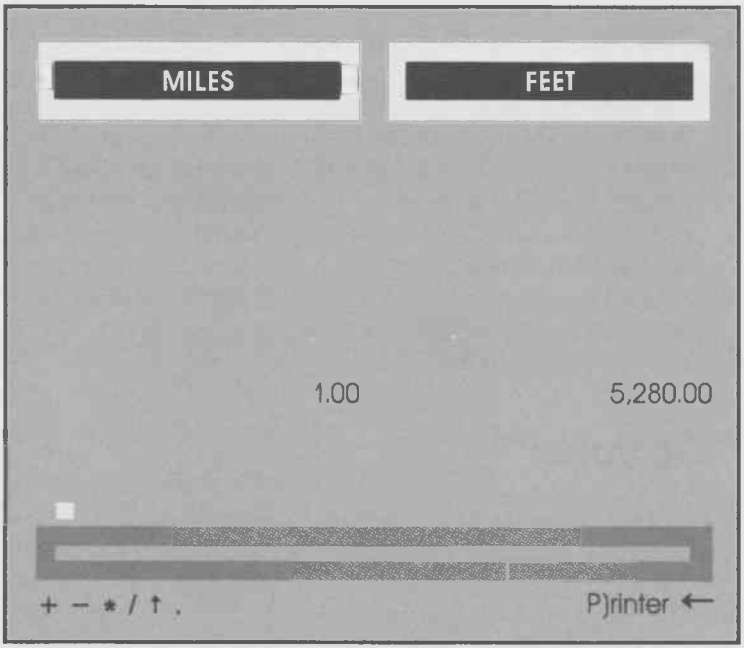
There's "More . . ."

Three categories—AREA, LENGTH, and TIME IN CITIES—offer more units than can fit on one screen. If you wish to see the rest, use the same key as you just used to move your cursor and select MORE . . .; press **RETURN**. The second "page" will appear on your screen. If you need to go back to the first screen, just press the **ESCAPE** key.

Entering Numbers

Most of the categories you pick will require you to enter a number. Again, this is very easy to do.

First, study your screen to see where the flashing cursor is located.



This is where you will enter your first number to get the conversion you want. For example, if you want to know how many feet are in a mile, type the correct number (in this case, 1) under MILES and then press RETURN. Automatically, the right answer will appear under the heading FEET.

Oops! Wrong Column!

Did your flashing cursor first appear under FEET instead of MILES? No problem. Just press **RETURN** to switch columns before entering a number.

Rules to Remember

Here are *Figures and Formulas*' rules to remember:

- ☆ You may type up to sixteen digits, including decimal points.
- ☆ Do not include any commas.
- ☆ When you enter a number and wish to print it on your printer, *Figures and Formulas* will automatically format it with commas and decimal places, and round the number to the last decimal place. Note: Fractions less than a half are dropped and fractions more than a half are rounded to the next higher number (e.g., 4.4 = 4, but 4.5 = 5).
- ☆ You can't divide by zero.

What are your "Options"?

The symbols you see at the bottom of your screen represent the available options of the program. They are:

- ☆ The Five Arithmetic Options
- ☆ The Decimal Point Option
- ☆ The Printer Option
- ☆ The ESCAPE Option

THE FIVE ARITHMETIC OPTIONS

You can perform five standard arithmetic operations: addition, subtraction, multiplication, division, and exponentiation. Refer to your machine-specific guide to learn which keys to press for these operations.

Take a moment now to locate these keys on your keyboard.

To see how easy it is to calculate with *Figures and Formulas,* let's look at a simple example. Say you want to know what 16 times 13 is. Here's what to do:

1 Enter 16
2 Press RETURN
3 Press the multiplication key
4 Enter 13
5 Press RETURN

The answer will quickly appear on your screen. If you already have a figure entered either through conversion or another arithmetic operation, skip Step 2. For example, if you want to divide the above calculation by 3, you could either

1 Press the division key
2 Enter 3
3 Press RETURN

or

1 Press the division key
2 Press RETURN
3 Enter 3
4 Press RETURN

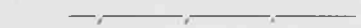
These arithmetic options are available in all the categories except TEMPERATURE. Note: Only addition and subtraction are available in TIME IN CITIES.

THE DECIMAL POINT OPTION

When you enter numbers for a new pair of units in all categories except NUMBER SYSTEMS, TIME IN CITIES, and TEMPERATURE, the number of decimal places automatically is set at two. (Both NUMBER SYSTEMS

and TIME IN CITIES do not permit decimal values; in TEMPERATURE, numbers always have one decimal place.)

You may, however, move the decimal point if you wish. To do this, press the **PERIOD** key, then **RETURN**. The following pattern will appear on your screen:



To move the decimal to the left or to the right, check your machine-specific guide to see which key(s) to use. When the pattern you see on your screen indicates the number of decimal places you want, press **RETURN**.

THE PRINTER OPTION

The Printer Option works as a toggle switch: If you press P, the printer will turn "on" if it is "off" or "off" if it is "on." When the printer is "on," the numbers and the headings for the current units you see on the screen will be printed.

The Printer Option works a little differently in the quiz sections. When you press P in the quiz sections, the printer does not remain "on"; it will only print the problem you currently see on your screen. So each time you want to print in the quiz sections you must press P.

THE ESCAPE OPTION

The ESCAPE Option returns you to the previous screen. Just press the ESCAPE key.

Categories

Area

SUBCATEGORIES

Non-Metric	Metric
SQUARE INCHES	SQUARE MILLIMETER
SQUARE FEET	SQUARE CENTIMETERS
SQUARE YARDS	SQUARE DECIMETERS
SQUARE RODS	SQUARE METERS
ACRES	SQUARE DECAMETERS
SQUARE MILES	ARES
QUARTER SECTIONS	SQUARE HECTOMETERS
SECTIONS	HECTARES
TOWNSHIPS	SQUARE KILOMETERS
	MORE . . .

Notes

- ☆ Remember to press MORE . . . to see a list of places around the world whose areas are recorded in your program. (By the way, 59,766.15 Superdomes will fit inside Rhode Island.)
- ☆ Feel free to use AREA and LENGTH interchangeably for your calculations. For example, if you need to know how much carpeting you'll need for a room, first measure the length and width of the room; next, use LENGTH to calculate square feet (e.g., 16 × 12 = 192 square feet). Then, use AREA to convert square feet into square yards. Lastly, multiply the price per square yard by this figure and you'll know whether or not you're getting a bargain on carpeting.

Dry Volume

SUBCATEGORIES

Non-Metric	Metric
CUBIC INCHES	CUBIC MILLIMETERS
CUBIC FEET	CUBIC CENTIMETERS
PERCHES OF STONE	CUBIC DECIMETERS
CUBIC YARDS	CUBIC METERS
CORDS OF WOOD	CUBIC DECAMETERS
PINTS	CUBIC HECTOMETERS
QUARTS	CUBIC KILOMETERS
PECKS	
BUSHELS	
BARRELS	

Notes

- ☆ Although Pint, Quart, and Bushel are listed under LIQUID VOLUME as well, they are not the same measurements. So, if you're baking a cake, don't use the Liquid Pint to measure your flour or the Dry Pint to measure your milk.
- ☆ With this category, you can easily calculate how many cords of wood to buy for winter if you know the dimensions of your wood shed.

Length

SUBCATEGORIES

Non-Metric	Metric
BARLEYCORNS	MILLIMETERS
INCHES	CENTIMETERS
HANDS	DECIMETERS
FEET	METERS
PACES	DECAMETERS
YARDS	HECTOMETERS
FATHOMS	KILOMETERS
FURLONGS	MORE . . .
RODS	
MILES	
KNOTS	
LEAGUES	

Notes

- ☆ Be sure to select MORE . . . to see a list of places in the world (and beyond) whose heights are recorded in the program.
- ☆ Remember you can use LENGTH interchangeably with AREA to calculate such things as the number of flats of flowers required for a flower bed; the amount of paint you'll need to paint your guest room; or the length of wire it will take to fence your yard.

Liquid Volume

SUBCATEGORIES

Non-Metric	Metric
TEASPOONS	MILLILITERS
TABLESPOONS	CENTILITERS
FLUID OUNCES	DECILITERS
GILLS	LITERS
CUPS	DECALITERS
PINTS	HECTOLITERS
QUARTS	KILOLITERS
GALLONS	
BARRELS	
HOGSHEADS	

Notes

- ☆ Cousin Frieda brought back the most scrumptious Viennese torte recipe from her trip to Austria. But you discover that all the measurements are in metric units. No problem now that you have *Figures and Formulas*!
- ☆ Once you convert Frieda's recipe into teaspoons, tablespoons, and cups, use RECIPES to calculate the exact quantities so you'll have enough torte to go around.

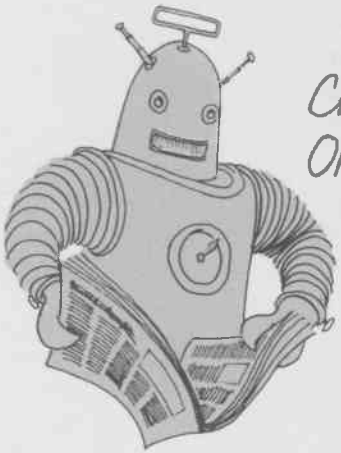
Money

SUBCATEGORIES

FOREIGN CURRENCY	US DIMES
US DOLLARS	US NICKELS
US HALF DOLLARS	US PENNIES
US QUARTERS	

Notes

- ☆ You will need to supply the program with the current exchange rate (most newspapers and banks have this information readily available).
- ☆ Type only one word for a foreign currency (e.g., POUND for British Sterling, FRANC for French Franc).



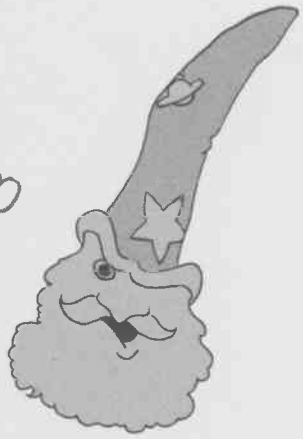
CHECK YOUR NEWSPAPER OR BANK FOR THE CURRENT EXCHANGE RATES.

Number Systems

SUBCATEGORIES

Base	Digits Used
BINARY (BASE 2)	0 TO 1
BASE 3	0 TO 2
BASE 4	0 TO 3
BASE 5	0 TO 4
BASE 6	0 TO 5
BASE 7	0 TO 6
OCTAL (BASE 8)	0 TO 7
BASE 9	0 TO 8
DECIMAL (BASE 10)	0 TO 9
BASE 11	0 TO 9 PLUS A
BASE 12	0 TO 9 PLUS A, B
BASE 13	0 TO 9 PLUS A TO C
BASE 14	0 TO 9 PLUS A TO D
BASE 15	0 TO 9 PLUS A TO E
HEXADECIMAL (BASE 16)	0 TO 9 PLUS A TO F
ROMAN NUMERALS	I, V, X, L, C, D, AND M

THERE'S NO MYSTERY TO BASE NUMBERS. JUST THINK IN TERMS OF COLUMNS.



GENERAL RULES FOR BASE NUMBERS

There is no great mystery to base numbers (after all, you've been using base 10 all of your life; you've just called it "decimals" instead of "base 10").

Let's look at the number "one hundred" as it is written using base 10 (decimals). As you know, the three digits in 100 each are located in "columns": the one's column; the ten's column; and the hundred's column. These columns are multiples of ten (which is why it is called base 10). In the number 100, there are 0 units in the one's column; 0 units in the ten's column; and 1 unit in the hundred's column. Therefore, the digits "1-0-0" in base 10 represent the number "one hundred."

Simple? Of course! And it's just as easy to understand base 2 (binary). With base 2, each column is a multiple of two instead of ten. (Remember that zero is counted as a unit in all base numbers.) The number "one hundred" in base 2 is written as 110 0100. Just as in base 10, the first column in base 2 is reserved for ones; all of the other columns are multiples of two (2, 4, 8, 16, 32, 64, etc.). The number 110 0100 in base 2 indicates there is one unit in the four's column; one unit in the thirty-two's column; and one unit in the sixty-four's column. If you add 4 + 32 + 64, you get 100.

Why is it good to know binary numbers? Because computer programming is based on the binary system and computers can only think in terms of "twos": ON and OFF. No one really programs in binary, however. Programmers usually use octal (base 8) or hexadecimal (base 16), both of which have a close relationship to the binary system.

Roman Numeral	Decimal Value
I	1
V	5
X	10
L	50
C	100
D	500
M	1000

GENERAL RULES FOR ROMAN NUMERALS

- ☆ Repeating a numeral repeats its value (e.g., XX = 20).
- ☆ Only I, X, C, and M can be repeated up to three times in a row (e.g., XXX).
- ☆ A numeral placed AFTER one of greater value is ADDED (e.g., VI = 6).
- ☆ A numeral placed BEFORE one of greater value is SUBTRACTED (e.g., IV = 4). Only I, X, C, and M can be used in this way.
- ☆ A line above a numeral multiplies its value by 1,000 (e.g., $\overline{X}$ = 10,000). You will not be able to enter this "overline," but you may see it in converted and computed numbers.

Note

- ☆ Unlike elsewhere in the program, no decimal points are permitted in the NUMBER SYSTEMS category. All numbers must be whole numbers, or integers.

Recipes

Notes

☆ No category menu is offered when you select RECIPES. Instead, you will be asked two questions:

NUMBER RECIPE SERVES?

NUMBER GUESTS?

You cannot enter 0 (zero) to answer these questions.

☆ RECIPES only calculates; it does not convert. If you enter the amount measured in teaspoons, for example, the calculated figure will also be in teaspoons. Remember you can use the DRY VOLUME and LIQUID VOLUME categories to do conversions.

☆ When recipes are multiplied for higher yields, the quality may be affected. RECIPES offers you only guidelines. Experience will help you to determine the proper amounts for higher yields.

Temperature

Notes

☆ No category menu is offered when you select TEMPERATURE because there are only two units: FAHRENHEIT and CELSIUS.

☆ Are you wondering about the Centigrade scale? The Celsius and Centigrade scales are the same (Celsius was a Swedish astronomer of the eighteenth century who invented the Centigrade scale of temperature).

☆ No arithmetic options are given because conversions are done for you automatically. The formulas for conversions between temperature units are:

CELSIUS = (FAHRENHEIT − 32) × 5/9

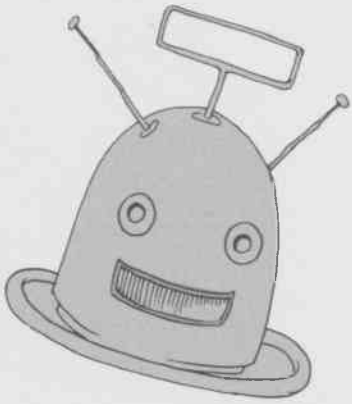
FAHRENHEIT = CELSIUS × 9/5 + 32

☆ The program does not allow computations of temperatures lower than −273.1 degrees Celsius (approximately −460 degrees Fahrenheit), as those temperatures do not exist (absolute zero is −273.1 degrees Celsius).

Time

SUBCATEGORIES

SECONDS	MONTHS
MINUTES	YEARS
HOURS	DECADES
DAYS	CENTURIES
WEEKS	MILLENIA



Time in Cities

Notes

☆ When you select TIME IN CITIES, the first screen you see offers you a list of U. S. and Canadian cities. To see a list of international cities, select MORE . . . .

☆ Times are based on a city's time zone in relation to Eastern Standard Time.

☆ Because a 24-hour clock is used, you don't need to specify a.m. or p.m. (e.g., 3:15 a.m. = 3:15; 3:15 p.m. = 15:15)

☆ Use a colon (:) to separate hours and minutes.

Weight

SUBCATEGORIES

Non-Metric	Metric
GRAINS	MILLIGRAMS
PENNYWEIGHTS	CENTIGRAMS
CARATS	DECIGRAMS
DRAMS	GRAMS
OUNCES	DECAGRAMS
TROY OUNCES	HECTOGRAMS
TROY POUNDS	KILOGRAMS
POUNDS	METRIC TONS
STONES	
HUNDREDWEIGHTS	
TONS	
LONG TONS	

Notes

- ☆ Many scales in Europe are based on the kilogram. Being able to convert easily between kilograms and pounds will help you to know just how much the luggage you're taking overseas weighs.
- ☆ If you are counting calories, use the OUNCES and POUNDS conversion to get more accurate information regarding your caloric intake.

Weight on Planets

SUBCATEGORIES

On The SUN	On JUPITER
On MERCURY	On SATURN
On VENUS	On URANUS
On EARTH	On NEPTUNE
On The MOON	On PLUTO
On MARS	

Notes

- ☆ This is a fun category that will, at the same time, give you a different perspective about living in our solar system.
- ☆ Although the sun and the moon are not planets, they have been included because they are important heavenly bodies in our solar system.
- ☆ The program lists the planets based on their distance from the sun.
- ☆ The calculations are provided automatically and are based on the mass of the planets and their gravitational force upon matter.

Quiz—Flash Cards

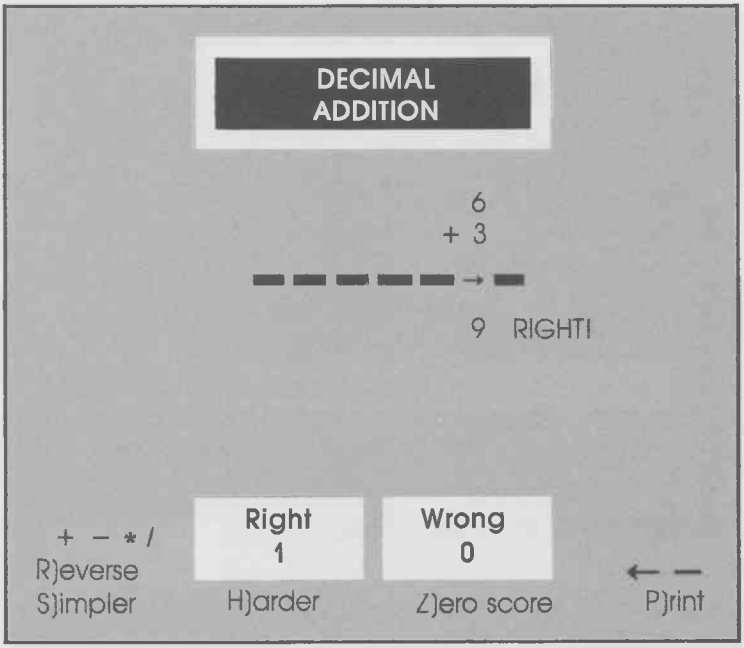
SUBCATEGORIES

Base	Digits Used
BINARY (BASE 2)	0 TO 1
BASE 3	0 TO 2
BASE 4	0 TO 3
BASE 5	0 TO 4
BASE 6	0 TO 5
BASE 7	0 TO 6
OCTAL (BASE 8)	0 TO 7
BASE 9	0 TO 8
DECIMAL (BASE 10)	0 TO 9
BASE 11	0 TO 9 PLUS A
BASE 12	0 TO 9 PLUS A, B
BASE 13	0 TO 9 PLUS A TO C
BASE 14	0 TO 9 PLUS A TO D
BASE 15	0 TO 9 PLUS A TO E
HEXADECIMAL (BASE 16)	0 TO 9 PLUS A TO F
ROMAN NUMERALS	I, V, X, L, C, D, AND M

Notes

- ☆ Choose only one subcategory, not a pair as in the other parts of the program.
- ☆ *Figures and Formulas* gives you a quiz in your chosen number system. The arrow that appears on your screen indicates the direction you will type the digits. By pressing R, you can change the direction (in division, however, you can only type left to right).

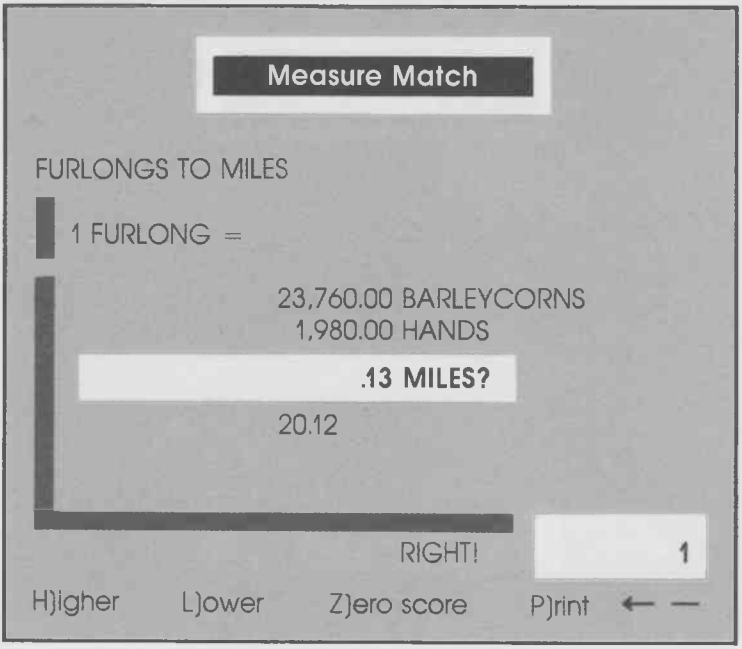
- ☆ To control the difficulty of the problem, press S for SIMPLER or H for HARDER.
- ☆ To change the type of arithmetic operation, press the specific key for the operation you wish.
- ☆ If your answer is correct, the program will indicate it, and points will be added to your score.
- ☆ To reset your score at any time, press Z for ZERO SCORE.
- ☆ To print the problem that appears on your screen, press P.



Quiz—Measure Match

SUBCATEGORIES

AREA	LIQUID VOLUME
DRY VOLUME	WEIGHT
LENGTH	



Scarborough Systems, Inc.

Notes

- ☆ Choose a pair of units yourself or press **R** for RANDOM to have the program choose for you.
- ☆ Use the correct key to move to the answer of your choice, then press **RETURN**.
- ☆ If your answer is correct, the program will indicate it, and points will be added to your score (shown in the small box on the bottom right of your screen).
- ☆ To reset your score, press **Z** for ZERO SCORE.
- ☆ If you make an incorrect choice, you will still be learning something because the answer is actually a correct conversion, but for a unit other than the one you wanted.
- ☆ The program will not allow you to make the same incorrect choice more than once.
- ☆ Some pairs of units in a category will create answers so large or so small that they cannot be printed in the space given. If such a pair is chosen, the program will ask you to CHOOSE ANOTHER PAIR and will display the category menu again.
- ☆ Both the FLASH CARD and MEASURE MATCH quizzes have different levels of difficulty from which to select. The difficulty in the MEASURE MATCH quiz is inherent in the relationship between pairs of units. To challenge you further you can press **L** for LOWER NUMBERS or **H** for HIGHER NUMBERS; the program will add zeros to make the quiz easier or more difficult.

Replacement Policy and Disclaimer of All Warranties and Liability.

Scarborough Systems, Inc., and Lizzy Corp. make no warranties, either expressed or implied, with respect to the software described in this manual, its quality, performance, merchantability, or fitness for any particular purpose. This software is licensed "as is." The entire risk as to the quality and performance of the software is with the buyer. In no event will Scarborough Systems, Inc., and Lizzy Corp. be liable for direct, indirect, incidental, or consequential damages resulting from any defect in the software even if they have been advised of the possibility of such damages. Some states do not allow the exclusion or limitation of implied warranties or liabilities for incidental or consequential damages; this limitation or exclusion may not apply to you.

If, during the first thirty days after you have purchased *MasterType's Figures and Formulas*, it should fail to boot, you may return it to your dealer or to Scarborough Systems, Inc. for a free replacement copy. Your dated purchase receipt must be included with your claim. If your disk fails to boot or becomes damaged after thirty days, you may return it to Scarborough Systems, Inc. along with a check or money order in the amount of $5.00 payable to Scarborough Systems, Inc. We will then send you a new copy of *MasterType's Figures and Formulas*.

SCARBOROUGH SYSTEMS, INC.
25 NORTH BROADWAY
TARRYTOWN, NEW YORK 10591 U.S.A.

Apple makes no warranties, either expressed or implied, regarding this computer software package, its merchantability or its fitness for any particular purpose. The exclusion of any implied warranties is not permitted by some states. The above exclusion may not apply to you. This warranty provides you with specific legal rights. There may be other rights you may have, which vary from state to state.

CUT ALONG DOTTED LINE

Proof of Purchase

This coupon certifies that I have purchased *MasterType's Figures and Formulas* by Scarborough Systems.

Signature _____

A word about Scarborough and MasterType's Figures + Formulas.™

Software from Scarborough is designed to take full advantage of the capabilities of your computer . . . and, at the same time, it is enjoyable and easy to use.

Each Scarborough program undergoes extensive testing and evaluation, and each step of the creative process is monitored to insure the delivery of a program that will bring new satisfaction and rewards to the home computer user.

Whether your interests in home computing are directed towards furthering education or increasing the productivity of your household, Scarborough's software fulfills the promises that heralded the arrival of your home computer.

The Scarborough System.